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TRANSMITTAL LETTER (General - Patent Pending)	Docket No. **JPR1220-1**

OIPE JC10 OCT 16 2003 PATENT & TRADEMARK OFFICE

In Re Application Of: **Jeffrey H. Price**

Serial No.	Filing Date	Examiner	Group Art Unit
09/837,871	**April 17, 2001**	**S.K. Yam**	**2878**

Title: **MULTIPARALLEL THREE DIMENSIONAL OPTICAL MICROSCOPY SYSTEM**

TO THE COMMISSIONER FOR PATENTS:

Transmitted herewith is:

Brief on Appeal (in triplicate)
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in the above identified application.

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Terrance A Meador

Signature

Dated: October 14, 2003

Terrance A. Meador, Esq.
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1050 Rosecrans Street, Suite K
San Diego, California 92106

I certify that this document and fee is being deposited on October 14, 2003 with the U.S. Postal Service as first class mail under 37 C.F.R. 1.8 and is addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Terrance A. Meador

Signature of Person Mailing Correspondence

TERRANCE A. MEADOR

Typed or Printed Name of Person Mailing Correspondence

cc:

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:		)		
		)		
	Jeffrey H. Price	)	Group No.:	2878
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For: **MULTIPARALLEL THREE DIMENSIONAL OPTICAL MICROSCOPY SYSTEM**

CERTIFICATION UNDER 37 CFR § 1.8

I hereby certify that the documents referred to as enclosed herein are being deposited with the United States Postal Service as first class mail on this date October 14, 2003, in an envelope addressed to: Commissioner for Patents, Box 1450, Alexandria, VA. 22313-1450

October 14, 2003 — Terrance A. Meador
Date — Signature

MAIL STOP: APPEAL BRIEF-PATENTS
Commissioner for Patents
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BRIEF ON APPEAL

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The Board is respectfully requested to note the change of correspondence address for this application.

REAL PARTY IN INTEREST

The real party in interest is Jeffrey H. Price. There are possible claims to interest in this application by the University of California, and by Q3DM, LLC., San Diego, CA.

RELATED APPEALS

There are no related appeals.

STATUS OF THE CLAIMS

Claims 1-29 have all been rejected in the Final Action mailed February 11, 2003.

STATUS OF AMENDMENTS

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SUMMARY OF THE INVENTION

The invention concerns a system for scanned three-dimensional (3D) imaging of a sample. The desirability of a 3D image is set forth at page 1, lines 18-28. Concisely, a 3D microscopic image of a biological sample contains useful clinical information which is not available in a two dimensional microscopic image of the sample. But, an impairment in the 3D microscopic imaging technology that motivated this invention was the need to limit scan speed in order to enhance resolution of the image. This invention affords an increase in image resolution without a sacrifice in scan speed.

With reference to FIGS. 1A and 1B and to page 4, line 23-page 6, line 13, the invention is illustrated by a microscope system embodiment 10 through which a 3D sample 12 is viewed. The microscope system has a sample holder 24; a sample volume 25 contains the sample 12 when supported on the sample holder 24. The sample 12 is illuminated by a light source 14 via an optical pathway A including elements 16, 18, 20, 22. The sample is observed by a detector assembly 30 which receives light from the illuminated sample along optical pathway B including elements 22, 20, 18, 16, 26, 28, and 34.

As best seen in FIG. 1B, and as described at page 5, lines 3-27, illuminating light is reflected off light selection optics 18 through the focus differentiation optics 20. A plurality of sub beams 34 defined by the light differentiation optics 20 illuminate the sample 12. The beams cause the sample 12 to fluoresce, or are reflected from the sample, or both. On the return path from the illuminated sample 12, sub beams 34 fluoresced by and/or reflected from the sample 12 pass via microscope optics 22 through the focus differentiation optics 20, the light selection optics 18, dichroic mirror 16 and relay optics 26 to beam divergence optics 28 and thence to the detector assembly 30.

Per the description at page 9, lines 4-9, and with reference to FIGS. 2 and 3A-3D, the detector assembly 30 includes a plurality of detectors 56, each having a view of a particular region of the sample 12 which is provided at a particular focal plane for the detector by the focus differentiation optics 20. Each focal plane is positioned at a different distance from the sample holder 24, affording a 3D view of the sample12 in the sample volume 25. As shown in FIG. 2, the sub beams are fanned out by the beam divergence optics 28 to semicircular arrays of detectors 56.

The light selection optics 18, best seen in FIGS. 4 and 5A and 5B, transmit light originating at respective focal planes in the sample volume 25 while screening out light not originating at the respective focal planes. As described at page 12, line 12-page 14, line 19, the light selection optics 18 has an array of regions which can be switched on and off to

correspondingly switch light to illuminate or not illuminate corresponding regions of the sample12 and be observed or not observed by corresponding detectors 56. The light selection optics 18 enhance the confocality of the system. The light selection optics 18 allows light to reach a detector from a respective focal plane, while suppressing light from other focal planes. This reduces image artifacts caused by detection of light from other focal planes and enhances the 3D image of the sample 12 acquired by the system. Positioning the light selection optics 18 at an image plane increases the ratio of light received by a detector from a respective focal plane to light received by the same detector from other focal planes. See page 14, lines 1-10. Implementation of light selection optics as an array of individually-controllable mirrors is shown in FIGS. 6A-6C. As the accompanying description sets forth, various patterns of light selection can be selected based upon the particular implementation of the focus differentiation optics 20, all to enhance the desired confocal effect.

The generation of a digital representation of a 3D image of the sample12 is afforded by the processing architecture illustrated in FIG. 7 which processes, filters, generates, and stores a 3D image of the sample 12. The enhanced confocality afforded by the light selection optics allows the processing architecture to generate high-resolution 3D images of samples without sacrificing scanning speed.

ISSUES

The issues are:

1. whether claims 1, 2, 4-10, 12, 16, 17, 21-24, and 26 are anticipated by US Patent 6,024,283 ("Campanelli");

2. whether claims 3, 11, 13-15, and 18 are obvious in view of Campanelli modified to include a pulsed laser to stimulate fluorescence, modified to include adjustable focus differentiation optics, modified to include fluorescence of a sample, and modified to include magnification adjustment optics;

3. whether claims 19 and 25 are obvious over Campanelli in view of US Patent 5,838,538 ("Litsche"); and

4. whether claims 20 and 27-29 are obvious over Campanelli in view of US Patent 6,382,510 ("Ni").

GROUPING OF CLAIMS

Claims 1, 2, 4-9, 12, 16, 17, 21-24 and 26 stand or fall together.

Claim 3 stands or falls alone.

Claim 10 stands or falls alone.

Claims 11, 13 and 14 stand or fall together.

Claim 15 stands or falls alone.

Claim 18 stands or falls alone.

Claims 19 and 25 stand or fall together.

Claims 20 and 27-29 stand or fall together.

ARGUMENT

Claims 1, 2, 4-10, 12, 16, 17, 21-24 and 26 are rejected for anticipation by Campanelli. That rejection is incorrect and should be withdrawn for the following reasons.

Axiomatically, rejection of a claim for anticipation by a reference requires that the reference explicitly include, in its four corners, all elements or steps, and all limitations thereof recited in the rejected claim. Any subject matter of the claim that is missing from the reference is inherent in the reference only if extrinsic evidence clearly shows that the missing subject matter is necessarily present in the thing described in the reference and that it would be so recognized by persons of ordinary skill. Furthermore, to anticipate a claim, a reference must enable the claimed subject matter.

The invention of the rejected claims is summarized above. Campanelli in FIG. 3b illustrates an embodiment of a bar code reader in which a liquid crystal (LC) array 42 is interposed between a surface with a bar code 43 on one side and an array 46 of focusing lenses on the other side. A detector array 45 is positioned behind the array 46. These elements are arranged such that specific detector elements in the detector array 45 are associated with a lens element in the array 46 having a specific optical characteristic such as focal length or focal distance. See Campanelli at column 7, lines 7-15 and lines 26, 27. The LC array is simply described as "operative in connection with a detector array 45 which images a field of view, so that the LC array selects and defines the portion of the field of view which is imaged upon the array 45." See Campanelli at column 7, lines 7-11. The arrangement of elements is operated to "select a corresponding group of reading elements for transmitting light through corresponding selected element, whereby the reader is operated at a predetermined selected operating focal distance." See Campanelli at column 7, lines 31-34.

That is to say, the embodiment of Campanelli illustrated in FIG. 3b is structured and operated to select <u>one</u> focal distance and to operate at that <u>one</u> focal distance. This comports with Campanelli's objective of matching an array 45 of detector elements with a bar code symbol 43 "situated at an arbitrary or unknown distance from the array, or the plane of the symbol is positioned in a skewed manner with respect to the plane of the array." Campanelli at column 7, lines 15-22. Campanelli just wants to adapt a bar code reader to enable it to obtain a two-dimensional (2D) picture of the 2D bar code symbol in response to varying circumstances of orientation between the surface on which the bar code appears and a bar code reader. Campanelli does not want to obtain a 3D picture of anything.

Campanelli in FIG. 3c illustrates an embodiment of a bar code reader in which the detection elements are not illustrated. This figure illustrates a means for scanning a bar code by control of illumination elements in the form of a two-dimensional array of VCSEL lasers 10 disposed in combination with an array of lenses 35. A lens 35 is also illustrated. The element 36 shown in FIG. 3c is not described in the specification. Campanelli's specification does not describe how this illumination arrangement is disposed or operates with detectors.

Taking claim 1 as representative, a system for imaging a sample is claimed. The system includes "a plurality of detectors which are each focussed at a respective focal plane in a sample volume ... ". The claim further recites "light selection optics positioned between the plurality of detectors and the sample volume" that transmits light "originating at the respective focal planes while screening out light which originates from outside of the respective focal planes." As a result, "a three dimensional image of the sample can be obtained by combining the image from each detector." Specification at page 4, lines 12-14. Similar limitations are found in claim 24. At column 8, lines 32-35 of Campanelli, the elements read "a symbol located at a distance from the reader ...". But, where is such a symbol located? According to Campanelli at column 1, lines 27-29, such indicia appear "on a label or on the surface of an article"; at column 7, line 20, the symbol is on a "plane." Campanelli essentially wants a single, planar, two dimensional picture of a symbol on a surface or a plane. For this, Campanelli provides the means to read a bar code "at a predetermined selected operating focal distance", not at "respective focal planes" in a sample volume. Campanelli omits a "sample volume", and there are no "focal planes in a sample volume". Therefore, Campanelli does not describe "a plurality of detectors which are each focussed at a respective focal plane in a sample volume" or "light selection optics" for "transmitting to the detectors a portion of light originating at the respective focal planes while screening out light which originates from outside of the respective focal planes".

Claim 10 recites "focus differentiation optics". In the rejection of claim 1 in the Final Action, the Examiner identifies element 42 in FIG. 3b as "light differentiation optics". In supporting the rejection of claim 10 for anticipation the Examiner has further identified element 42 as the "focus differentiation optics" without explaining how Campanelli's element 42 has the structure and performs the functions of these two elements in claim 10. Campanelli's element 42 is simply an LC array that is selectively switched to enable a corresponding group of reading elements in order to operate a bar code reader "at a predetermined distance." This is not the function of the focus differentiation optics, which is to cause "each detector to be focussed at different depths within the sample." In fact, Campanelli omits "focus differentiation optics".

Accordingly, Campanelli omits subject matter that is explicitly recited in claims 1 and 24, in claims 2, 4-10, 12, 16, and 17, which depend from claim 1, and in claim 26 which depends from claim 24.

In spite of the applicants' timely request, no extrinsic evidence has been introduced which clearly shows that such omitted subject matter is necessarily present in the bar code readers described by Campanelli, and that it would be so recognized by persons of ordinary skill. Accordingly, the record does not establish the inherency of the omitted subject matter in Campanelli.

It is further noted that the passages of Campanelli cited to support the rejection of claims 1 and 24, and the associated figures (FIGS. 3b and 3c) do not enable the recited invention. Each figure shows only a planar bar code 43, 37 at which light beams are focussed at different focal distances. The distances are evidently available in order to provide manual or automatic selection of "a focal plane of interest ... ". Campanelli, column 7, lines 15-22 and column 8, lines 27-29. So, evidently, Campanelli enables the selection of "a" (single) focal plane. There is no description in connection with these passages, or any illustration in FIGS. 3b and 3c of Campanelli, that enables "transmitting to the detectors a portion of light originating at the respective focal planes while screening out light which originates from outside of the respective focal planes." Further, Campanelli nowhere teaches or shows how a plurality of detectors can be "focussed at a respective focal plane in a sample volume". Campanelli describes selection and use of only one focal distance or focal plane. Accordingly, Campanelli does not enable the subject matter of the rejected claims.

In view of the failure of Campanelli to include all of the subject matter of, and to enable, claims 1, 2, 4-10, 12, 16, 17, 21-24 and 26, the Board is respectfully requested to instruct the Examiner to withdraw this rejection.

Claims 3, 11, 13-15, and 18 are rejected for obviousness over Campanelli. That rejection is incorrect and should be withdrawn for the following reasons.

Prima facie, rejection of a claim for obviousness over a modified reference requires a teaching or suggestion to modify the reference as proposed in the rejection, a reasonable expectation of success, and inclusion in the modified reference of all elements or steps, and limitations thereof recited in the claim. See MPEP 2142, *et seq.*

As already set forth above in respect of claim 1 (from which these claims depend), Campanelli omits a "sample volume" and respective focal planes "in a sample volume". These limitations are not suggested by Campanelli. Campanelli's problem is to acquire a single, two-dimensional image of a symbol appearing on a label or a surface or a plane.

As to claim 3, the Examiner contends that it would be obvious to provide a pulsed laser with multiphoton fluorescence in an imaging device. The only "imaging device" described in Campanelli is a bar code reader. Fluorescence is used in imaging biological specimens, not in reading bar codes. The Examiner should be directed to submit an affidavit, Official Notice, or a reference to support the assertion, or to withdraw it.

As to claims 11, 13 and 14, it is pointed out above with respect to claim 10 that Campanelli omits a "focus differentiation optics". The rejection of these claims does not rectify that omission. If this element is considered to be obvious, the Examiner should be directed to submit an affidavit, Official Notice, or a reference to support the assertion, or to withdraw it.

As to claim 15, the Examiner contends that it is well known that bar codes fluoresce "due to the printing dyes of the bar code" and that it would be obvious to include a light source and optics to illuminate the bar code in order to make it fluoresce. Fluorescence is used in imaging biological specimens, not in reading bar codes. The Examiner should be directed to submit an affidavit, Official Notice, or a reference to support the assertion, or to withdraw it.

In view of Campanelli's failure to satisfy the requirements of *prima facie* obviousness with respect to claims 3, 11, 13-15, and 18, the Board is respectfully requested to instruct the Examiner to withdraw this rejection.

Claims 19 and 25 are rejected for obviousness over Campanelli in view of US Patent 5, 838,538 ("Litsche"). This rejection is incorrect for the failure of the proposed combination to include the limitations of claims 1 and 24 for the reasons given above, and the Board is respectfully requested to instruct the Examiner to withdraw it.

Claims 20 and 27-29 are rejected for obviousness over Campanelli in view of US Patent 56,382,510 ("Ni"). This rejection is incorrect for the failure of the proposed combination to include the limitations of claims 1 and 24 for the reasons given above, and the Board is respectfully requested to instruct the Examiner to withdraw it.

In view of the remarks made in this paper, it is submitted that all of the claims define subject matter that is patentably distinct from the references of record. Accordingly, the Board is respectfully requested to instruct the Examiner to indicate allowance of these claims.

Respectfully submitted
Terrance A. Meador

Date: October 14, 2007

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APPENDIX

1. (Original) A system for imaging of a sample, comprising:

a plurality of detectors which are each focussed at a respective focal plane in a sample volume; and

light selection optics positioned between the plurality of detectors and the sample volume, the light selection optics for transmitting to the detectors a portion of light originating at the respective focal planes while screening out light which originates from outside of the respective focal planes.

2. (Original) The system of claim 1, wherein the light selection optics includes a plurality of ON regions and OFF regions, the ON regions transmitting the light from the respective focal planes and the OFF regions blocking the light from the respective focal planes.

3. (Original) The system of claim 1, wherein a pulse laser provides multiphoton fluorescence.

4. (Previously Amended) The system of claim 2, wherein the ON regions can be controllably changed to OFF regions and the OFF regions can be controllably changed to ON regions.

5. (Original) The system of claim 1, wherein the light selection optics provide each detector with a degree of confocality.

6. (Previously Amended) The system of claim 4, wherein a pattern of ON and OFF regions controls a degree of confocality provided to the view from each detector.

7. (Previously Amended) The system of claim 4, wherein the light selection optics concurrently provide a degree of confocality to each of the detectors in the plurality of detectors.

8. (Previously Amended) The system of claim 2, wherein the light selection optics includes a plurality of mirrors which can occupy an ON position or an OFF position, the ON regions transmitting the light from the respective focal planes and the OFF regions blocking the light from the respective focal planes.

9. (Original) The system of claim 1, wherein each detector is focussed on a different region of the sample and the light selection optics selects the portion of each region which is viewed by the detector focussed on the region.

10. (Previously Amended) The system of claim 1, further comprising:
focus differentiation optics which causes each detector to be focussed at different depths within the sample.

11. (Previously Amended) The system of claim10, wherein the focus differentiation optics can be adjusted so as to alter where a detector is focussed within the sample.

12. (Previously Amended) The system of claim 10, wherein each detector is positioned equidistant from the focus differentiation optics.

13. (Original) The system of claim 11, wherein the material of the focus differentiation optics has at least one first side and a plurality of second sides, each second side being positioned at a different distance from the at least one first side.

14. (Original) The system of claim 13, wherein each second side is substantially parallel to one of the at least one first side.

15. (Previously Amended) The system of claim 1, further comprising:
a light source and optics configured to illuminate the sample volume with a light which causes a dye in the sample to fluoresce.

16. (Previously Amended) The system of claim 1, further comprising:
a light source and optics configured to illuminate the sample volume and transfer reflected light from the sample to the detectors.

17. (Previously Amended) The system of claim 1, further comprising:
relay optics positioned between the light selection optics and the detectors.

18. (Original) The system of claim 1, further comprising:

magnification adjustment optics positioned between the detectors and the light selection optics, the magnification adjustment optics compensating for differences in magnification in the view from each detector.

19. (Previously Amended) The system of claim 1, further comprising:

a sample fixture for holding the sample volume being viewed, the sample fixture configured to scan the sample relative to the light selection optics.

20. (Original) The system of claim 1, further comprising:

a processing system for processing and display of outputs of the detectors simultaneously as a three dimensional image.

21. (Original) The system of claim 1, wherein each detector includes an area array sensor.

22. (Original) The system of claim 21 wherein each detector is electrically controlled to produce time-delay-and-integration.

23. (Previously Amended) The system of claim 1, wherein the selection optics increase a ratio of intensity of light received at the detector which originates from the associated focal plane to the intensity of light received at the detector which originates from outside the associated focal plane.

24. (Original) A method for imaging a sample, comprising:

providing a plurality of detectors;

focussing each of the detectors at a respective focal plane within a sample volume; and

transmitting to the detectors a portion of light originating at the respective focal planes while screening out light which originates from outside of the respective focal planes.

25. (Previously Amended) The method of claim 24, further comprising:

moving the sample volume so at least a portion of the sample volume is scanned by the detectors.

26. (Original) The method of claim 24, further comprising:
providing output from each detector to a processing, display and storag system.

27. (Previously Amended) The method of claim 26, further comprising:
filtering the output from each detector to provide a filtered 3D image.

28. (Previously Amended) The method of claim 27 further comprising utilizing the processing, display and storage system to segment the 3D image into 3D object segments.

29. (Previously Amended) The method of claim 28 utilizing the processing, display and storage system to classify objects into types of objects based on measurements processed from the 3D object segments.

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PATENT & TRADEMARK OFFICE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:		)		
	Jeffrey H. Price	)	Group No.:	2878
Serial No.:	09/837,871	)	Examiner:	Stephen K. Yam
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With reference to FIGS. 1A and 1B and to page 4, line 23-page 6, line 13, the invention is illustrated by a microscope system embodiment 10 through which a 3D sample 12 is viewed. The microscope system has a sample holder 24; a sample volume 25 contains the sample 12 when supported on the sample holder 24. The sample 12 is illuminated by a light source 14 via an optical pathway A including elements 16, 18, 20, 22. The sample is observed by a detector assembly 30 which receives light from the illuminated sample along optical pathway B including elements 22, 20, 18, 16, 26, 28, and 34.

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ISSUES

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3. whether claims 19 and 25 are obvious over Campanelli in view of US Patent 5,838,538 ("Litsche"); and

4. whether claims 20 and 27-29 are obvious over Campanelli in view of US Patent 6,382,510 ("Ni").

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Claims 20 and 27-29 stand or fall together.

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Axiomatically, rejection of a claim for anticipation by a reference requires that the reference explicitly include, in its four corners, all elements or steps, and all limitations thereof recited in the rejected claim. Any subject matter of the claim that is missing from the reference is inherent in the reference only if extrinsic evidence clearly shows that the missing subject matter is necessarily present in the thing described in the reference and that it would be so recognized by persons of ordinary skill. Furthermore, to anticipate a claim, a reference must enable the claimed subject matter.

The invention of the rejected claims is summarized above. Campanelli in FIG. 3b illustrates an embodiment of a bar code reader in which a liquid crystal (LC) array 42 is interposed between a surface with a bar code 43 on one side and an array 46 of focusing lenses on the other side. A detector array 45 is positioned behind the array 46. These elements are arranged such that specific detector elements in the detector array 45 are associated with a lens element in the array 46 having a specific optical characteristic such as focal length or focal distance. See Campanelli at column 7, lines 7-15 and lines 26, 27. The LC array is simply described as "operative in connection with a detector array 45 which images a field of view, so that the LC array selects and defines the portion of the field of view which is imaged upon the array 45." See Campanelli at column 7, lines 7-11. The arrangement of elements is operated to "select a corresponding group of reading elements for transmitting light through corresponding selected element, whereby the reader is operated at a predetermined selected operating focal distance." See Campanelli at column 7, lines 31-34.

That is to say, the embodiment of Campanelli illustrated in FIG. 3b is structured and operated to select <u>one</u> focal distance and to operate at that <u>one</u> focal distance. This comports with Campanelli's objective of matching an array 45 of detector elements with a bar code symbol 43 "situated at an arbitrary or unknown distance from the array, or the plane of the symbol is positioned in a skewed manner with respect to the plane of the array." Campanelli at column 7, lines 15-22. Campanelli just wants to adapt a bar code reader to enable it to obtain a two-dimensional (2D) picture of the 2D bar code symbol in response to varying circumstances of orientation between the surface on which the bar code appears and a bar code reader. Campanelli does not want to obtain a 3D picture of anything.

Campanelli in FIG. 3c illustrates an embodiment of a bar code reader in which the detection elements are not illustrated. This figure illustrates a means for scanning a bar code by control of illumination elements in the form of a two-dimensional array of VCSEL lasers 10 disposed in combination with an array of lenses 35. A lens 35 is also illustrated. The element 36 shown in FIG. 3c is not described in the specification. Campanelli's specification does not describe how this illumination arrangement is disposed or operates with detectors.

Taking claim 1 as representative, a system for imaging a sample is claimed. The system includes "a plurality of detectors which are each focussed at a respective focal plane in a sample volume ... ". The claim further recites "light selection optics positioned between the plurality of detectors and the sample volume" that transmits light "originating at the respective focal planes while screening out light which originates from outside of the respective focal planes." As a result, "a three dimensional image of the sample can be obtained by combining the image from each detector." Specification at page 4, lines 12-14. Similar limitations are found in claim 24. At column 8, lines 32-35 of Campanelli, the elements read "a symbol located at a distance from the reader ...". But, where is such a symbol located? According to Campanelli at column 1, lines 27-29, such indicia appear "on a label or on the surface of an article"; at column 7, line 20, the symbol is on a "plane." Campanelli essentially wants a single, planar, two dimensional picture of a symbol on a surface or a plane. For this, Campanelli provides the means to read a bar code "at a predetermined selected operating focal distance", not at "respective focal planes" in a sample volume. Campanelli omits a "sample volume", and there are no "focal planes in a sample volume". Therefore, Campanelli does not describe "a plurality of detectors which are each focussed at a respective focal plane in a sample volume" or "light selection optics" for "transmitting to the detectors a portion of light originating at the respective focal planes while screening out light which originates from outside of the respective focal planes".

Claim 10 recites "focus differentiation optics". In the rejection of claim 1 in the Final Action, the Examiner identifies element 42 in FIG. 3b as "light differentiation optics". In supporting the rejection of claim 10 for anticipation the Examiner has further identified element 42 as the "focus differentiation optics" without explaining how Campanelli's element 42 has the structure and performs the functions of these two elements in claim 10. Campanelli's element 42 is simply an LC array that is selectively switched to enable a corresponding group of reading elements in order to operate a bar code reader "at a predetermined distance." This is not the function of the focus differentiation optics, which is to cause "each detector to be focussed at different depths within the sample." In fact, Campanelli omits "focus differentiation optics".

Accordingly, Campanelli omits subject matter that is explicitly recited in claims 1 and 24, in claims 2, 4-10, 12, 16, and 17, which depend from claim 1, and in claim 26 which depends from claim 24.

In spite of the applicants' timely request, no extrinsic evidence has been introduced which clearly shows that such omitted subject matter is necessarily present in the bar code readers described by Campanelli, and that it would be so recognized by persons of ordinary skill. Accordingly, the record does not establish the inherency of the omitted subject matter in Campanelli.

It is further noted that the passages of Campanelli cited to support the rejection of claims 1 and 24, and the associated figures (FIGS. 3b and 3c) do not enable the recited invention. Each figure shows only a planar bar code 43, 37 at which light beams are focussed at different focal distances. The distances are evidently available in order to provide manual or automatic selection of "a focal plane of interest ... ". Campanelli, column 7, lines 15-22 and column 8, lines 27-29. So, evidently, Campanelli enables the selection of "a" (single) focal plane. There is no description in connection with these passages, or any illustration in FIGS. 3b and 3c of Campanelli, that enables "transmitting to the detectors a portion of light originating at the respective focal planes while screening out light which originates from outside of the respective focal planes." Further, Campanelli nowhere teaches or shows how a plurality of detectors can be "focussed at a respective focal plane in a sample volume". Campanelli describes selection and use of only one focal distance or focal plane. Accordingly, Campanelli does not enable the subject matter of the rejected claims.

In view of the failure of Campanelli to include all of the subject matter of, and to enable, claims 1, 2, 4-10, 12, 16, 17, 21-24 and 26, the Board is respectfully requested to instruct the Examiner to withdraw this rejection.

Claims 3, 11, 13-15, and 18 are rejected for obviousness over Campanelli. That rejection is incorrect and should be withdrawn for the following reasons.

Prima facie, rejection of a claim for obviousness over a modified reference requires a teaching or suggestion to modify the reference as proposed in the rejection, a reasonable expectation of success, and inclusion in the modified reference of all elements or steps, and limitations thereof recited in the claim. See MPEP 2142, *et seq.*

As already set forth above in respect of claim 1 (from which these claims depend), Campanelli omits a "sample volume" and respective focal planes "in a sample volume". These limitations are not suggested by Campanelli. Campanelli's problem is to acquire a single, two-dimensional image of a symbol appearing on a label or a surface or a plane.

As to claim 3, the Examiner contends that it would be obvious to provide a pulsed laser with multiphoton fluorescence in an imaging device. The only "imaging device" described in Campanelli is a bar code reader. Fluorescence is used in imaging biological specimens, not in reading bar codes. The Examiner should be directed to submit an affidavit, Official Notice, or a reference to support the assertion, or to withdraw it.

As to claims 11, 13 and 14, it is pointed out above with respect to claim 10 that Campanelli omits a "focus differentiation optics". The rejection of these claims does not rectify that omission. If this element is considered to be obvious, the Examiner should be directed to submit an affidavit, Official Notice, or a reference to support the assertion, or to withdraw it.

As to claim 15, the Examiner contends that it is well known that bar codes fluoresce "due to the printing dyes of the bar code" and that it would be obvious to include a light source and optics to illuminate the bar code in order to make it fluoresce. Fluorescence is used in imaging biological specimens, not in reading bar codes. The Examiner should be directed to submit an affidavit, Official Notice, or a reference to support the assertion, or to withdraw it.

In view of Campanelli's failure to satisfy the requirements of *prima facie* obviousness with respect to claims 3, 11, 13-15, and 18, the Board is respectfully requested to instruct the Examiner to withdraw this rejection.

Claims 19 and 25 are rejected for obviousness over Campanelli in view of US Patent 5, 838,538 ("Litsche"). This rejection is incorrect for the failure of the proposed combination to include the limitations of claims 1 and 24 for the reasons given above, and the Board is respectfully requested to instruct the Examiner to withdraw it.

Claims 20 and 27-29 are rejected for obviousness over Campanelli in view of US Patent 56,382,510 ("Ni"). This rejection is incorrect for the failure of the proposed combination to include the limitations of claims 1 and 24 for the reasons given above, and the Board is respectfully requested to instruct the Examiner to withdraw it.

In view of the remarks made in this paper, it is submitted that all of the claims define subject matter that is patentably distinct from the references of record. Accordingly, the Board is respectfully requested to instruct the Examiner to indicate allowance of these claims.

Respectfully submitted

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APPENDIX

1. (Original) A system for imaging of a sample, comprising:

a plurality of detectors which are each focussed at a respective focal plane in a sample volume; and

light selection optics positioned between the plurality of detectors and the sample volume, the light selection optics for transmitting to the detectors a portion of light originating at the respective focal planes while screening out light which originates from outside of the respective focal planes.

2. (Original) The system of claim 1, wherein the light selection optics includes a plurality of ON regions and OFF regions, the ON regions transmitting the light from the respective focal planes and the OFF regions blocking the light from the respective focal planes.

3. (Original) The system of claim 1, wherein a pulse laser provides multiphoton fluorescence.

4. (Previously Amended) The system of claim 2, wherein the ON regions can be controllably changed to OFF regions and the OFF regions can be controllably changed to ON regions.

5. (Original) The system of claim 1, wherein the light selection optics provide each detector with a degree of confocality.

6. (Previously Amended) The system of claim 4, wherein a pattern of ON and OFF regions controls a degree of confocality provided to the view from each detector.

7. (Previously Amended) The system of claim 4, wherein the light selection optics concurrently provide a degree of confocality to each of the detectors in the plurality of detectors.

8. (Previously Amended) The system of claim 2, wherein the light selection optics includes a plurality of mirrors which can occupy an ON position or an OFF position, the ON regions transmitting the light from the respective focal planes and the OFF regions blocking the light from the respective focal planes.

9. (Original) The system of claim 1, wherein each detector is focussed on a different region of the sample and the light selection optics selects the portion of each region which is viewed by the detector focussed on the region.

10. (Previously Amended) The system of claim 1, further comprising:

focus differentiation optics which causes each detector to be focussed at different depths within the sample.

11. (Previously Amended) The system of claim10, wherein the focus differentiation optics can be adjusted so as to alter where a detector is focussed within the sample.

12. (Previously Amended) The system of claim 10, wherein each detector is positioned equidistant from the focus differentiation optics.

13. (Original) The system of claim 11, wherein the material of the focus differentiation optics has at least one first side and a plurality of second sides, each second side being positioned at a different distance from the at least one first side.

14. (Original) The system of claim 13, wherein each second side is substantially parallel to one of the at least one first side.

15. (Previously Amended) The system of claim 1, further comprising:

a light source and optics configured to illuminate the sample volume with a light which causes a dye in the sample to fluoresce.

16. (Previously Amended) The system of claim 1, further comprising:

a light source and optics configured to illuminate the sample volume and transfer reflected light from the sample to the detectors.

17. (Previously Amended) The system of claim 1, further comprising:

relay optics positioned between the light selection optics and the detectors.

18. (Original) The system of claim 1, further comprising:

magnification adjustment optics positioned between the detectors and the light selection optics, the magnification adjustment optics compensating for differences in magnification in the view from each detector.

19. (Previously Amended) The system of claim 1, further comprising:

a sample fixture for holding the sample volume being viewed, the sample fixture configured to scan the sample relative to the light selection optics.

20. (Original) The system of claim 1, further comprising:

a processing system for processing and display of outputs of the detectors simultaneously as a three dimensional image.

21. (Original) The system of claim 1, wherein each detector includes an area array sensor.

22. (Original) The system of claim 21 wherein each detector is electrically controlled to produce time-delay-and-integration.

23. (Previously Amended) The system of claim 1, wherein the selection optics increase a ratio of intensity of light received at the detector which originates from the associated focal plane to the intensity of light received at the detector which originates from outside the associated focal plane.

24. (Original) A method for imaging a sample, comprising:

providing a plurality of detectors;

focussing each of the detectors at a respective focal plane within a sample volume; and

transmitting to the detectors a portion of light originating at the respective focal planes while screening out light which originates from outside of the respective focal planes.

25. (Previously Amended) The method of claim 24, further comprising:

moving the sample volume so at least a portion of the sample volume is scanned by the detectors.

26. (Original) The method of claim 24, further comprising:
providing output from each detector to a processing, display and storage system.

27. (Previously Amended) The method of claim 26, further comprising:
filtering the output from each detector to provide a filtered 3D image.

28. (Previously Amended) The method of claim 27 further comprising utilizing the processing, display and storage system to segment the 3D image into 3D object segments.

29. (Previously Amended) The method of claim 28 utilizing the processing, display and storage system to classify objects into types of objects based on measurements processed from the 3D object segments.